

**REMARKS**

The Office Action indicates that claims 18 and 19 would be allowable if rewritten in independent form including all base claim limitations and any intervening claim limitations. The Applicant will rewrite claims 18 and 19 accordingly should their base claim not be allowed.

Claims 1-27 remain in the application.

The Office Action rejects claim 10 under 35 U.S.C. § 112 ¶ 1 as containing subject matter that the specification doesn't describe in a way that reasonably conveys to one skilled in the art that the inventor possessed the claimed invention. Specifically, the Office Action indicates that the specification doesn't support the range "less than and within 5 °C of the flash point" as claimed. In response, because the specification doesn't disclose a precise temperature range, the applicant has amended claim 10 to recite that the chamber is heated to a temperature just below and approximating the flash point of the precursor fiber being stabilized. This limitation is fully supported in the specification.

The Office Action rejects claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Pepper et al. According to the Office Action, Pepper et al. disclose the claimed process for making carbon fibers except for providing a furnace that includes both a carbonization heating zone and a stabilization heating zone. The Action states that it would have been obvious to relocate the Pepper et al. carbonization heating zone inside the Pepper et al. furnace that includes stabilization heating zones "to save space and capital costs". The Action goes on to say that using a single furnace for both stabilization and carbonization would be obvious because, according to *In re Japinske*, 86 USPQ 70, "the rearrangement of locations of parts is obvious to one of ordinary skill".

However, a more complete statement of the holding in *In re Japinske* is that there's no invention in shifting the position *if the operation of the device would not be thereby modified*. The Applicant maintains that shifting the carbonization heating zone

into the same furnace as the stabilization heating zone necessitates changes both in the claimed process and in the operation of the furnace. In fact, including the carbonization heating zone in the same furnace as the stabilization zone(s) constitutes a modification of the device. Also, the simple fact that the fibers would be stabilized and carbonized in a single furnace constitutes a modification of the process. As such, the *In re Japinske* rule doesn't apply under these facts. Rather than just stabilizing the fibers, the furnace now carbonizes them.

In *In re Japinske*, it was just the location of a starting switch for a hydraulic press that was changed. The location of the starting switch didn't affect the operation of the hydraulic press - it still handled workpieces in exactly the same way it would have if the starting switch had been left in its original position. Thus, the simple fact that the furnace is adapted to accommodate both processes is sufficient to overcome the objection based on *In re Japinske*. Moreover, relocating the carbonization heating zone into the same furnace as the stabilization heating zones changes the location where carbonization occurs and changes the time between stabilization and carbonization.

In addition, the Office Action identifies no teaching or suggestion that would motivate one skilled in the art to so modify the Pepper et al. device and method. The Action cites "saving space and capital costs", but these are only advantages, not teachings or suggestions. If all that were required to establish obviousness were the ability to think up or identify an advantage realized by a combination, then it would be hard to imagine any invention that shouldn't be denied patent protection for obviousness. Almost all patentable innovations provide some kind of advantage over the prior art. The Applicant asks that the Examiner identify such a teaching or suggestion.

Also, Pepper et al. also don't contemplate treating single fibers, disclosing instead the stabilization and carbonization of a multifilament sheet, tow, or web of carbon precursor fibers. As such, the suggested combination doesn't reach the invention of claim 8.

The Office Action rejects claims 1-3, 7, 9, 13-17, 20-24, and 27 under 35 U.S.C. § 103(a) as being unpatentable over Pepper et al. taken with Uchida et al.

Regarding claim 1, according to the Action, Pepper et al. disclose the claimed process for making carbon fibers except for carbonizing “without the use of a non-oxidizing atmosphere”. The Action indicates that it would have been obvious to modify the Pepper et al. process to include carbonization in an oxidizing atmosphere as taught by Uchida et al. “to eliminate the need for an additional gas supply, such as an inert gas.”

In response, the Applicant maintains that the suggested combination doesn’t reach the invention of claim 1 because it doesn’t include stabilizing and carbonizing steps that both occur in an oxidizing environment in the same heating chamber of the same furnace.

Also, the Action identifies an advantage (eliminating the need for an additional gas supply) realized by modifying the Pepper et al. method to include carbonizing fiber in an oxidizing atmosphere, but doesn’t identify a teaching or suggestion in the prior art (or general knowledge) that would motivate such a modification. The Applicant asks that the Examiner identify such a teaching or advantage or withdraw the objection.

Claim 2 depends from claim one, and recites continuous introduction of ambient air into a furnace, heating the air, and blowing it over a fiber in a heating chamber of the furnace as the fiber is drawn through. The Office Action doesn’t address the continuous introduction of ambient air. As such, the Applicant asks that the Examiner address this limitation and provide arguments to support the rejection. In any event, the Applicant maintains that claim 2 is allowable because it depends from an allowable base claim.

Claim 3 also depends from claim one, and recites a specific series of heating chamber temperatures and time durations for the heating chamber to be held at those temperatures both for stabilization and carbonization - a sequence that allows for successful carbonization of a fiber within an oxidizing atmosphere as the fiber is drawn through a single furnace. The Action concedes that Pepper et al. doesn’t teach the exact

temperatures and residence times claimed, but that it would have been obvious to find the optimum values for this process through "routine experimentation". According to the Action, the discovery of these values constitutes "optimization of a known process" under In re Boesch, 205 USPQ 215, unless significantly unexpected and different results can be shown.

A more comprehensive expression of the court's holding in In re Boesch is that "discovery of an optimum value of a result effective variable *in a known process* is ordinarily within the skill of the art". In re Boesch at 219 (emphasis added). As such, the Applicant maintains that the discovery of the claimed temperature and duration values doesn't constitute an "optimization of a known process" under this rule, because the claimed process is not known. As the 7 March 2003 office action concedes, Pepper et al. don't teach carbonization of PAN fibers in an oxidizing atmosphere. While Uchida et al. teach that carbonization can occur in an oxidizing process, the two references do not constitute a single "known process". Furthermore, even if the teachings of Uchida et al. and Pepper et al. were considered a single process, that combined process would not include stabilizing and carbonizing steps that both occur in an oxidizing environment in the same heating chamber of the same furnace. The Applicant maintains that for this reason, and because claim 3 depends from an allowable base claim, claim 3 is patentable over Pepper et al. taken with Uchida et al.

The Applicant maintains that claim 7 is allowable because it depends from an allowable base claim.

Regarding claim 9 the Office Action notes (at least apparently with regard to claim 9), that Pepper et al. disclose a stabilization process that may be accomplished using "a series of separate furnaces with one or more heating zones" as recited in claim 9. However, claim 9 also recites "continuously carbonizing the stabilized fiber by further heating the fiber in an oxidizing environment as it is drawn through the heating chamber of a final one of the plurality of furnaces." While Uchida et al. teach that carbonization can occur in an oxidizing process, neither the references nor general knowledge include

any teaching or suggestion that would motivate one skilled in the art to combine these processes to arrive at the invention of claim 9. As such, the Applicant maintains that claim 9 is patentable over Pepper et al. taken with Uchida et al.

The Applicant maintains that claim 13 is allowable because it depends from an allowable base claim.

The Action doesn't specifically refer to claim 14, but it appears that the Action has rejected this claim on the same basis as claim 3, i.e., that it recites a series of temperatures and exposure times. As such, the Applicant maintains that claim 14 is allowable on the same basis argued with respect to claim 3, above.

Regarding claims 15-17, the Action indicates that Pepper et al. teach heating the PAN fiber to a temperature up to about 260 degrees C in an oxidizing atmosphere such as air, and that there's not difference between the Pepper et al. process and that of applicant. However, Pepper et al. don't teach the precise temperatures and exposure times recited in claims 15 and 16 nor the introduction of ambient air into *each* furnace as recited in claim 17. For this reason, and because these claims all depend from an allowable base claim, the Applicant maintains that claims 15-17 are patentable over Pepper et al.

The Office Action doesn't appear to provide any reason for rejecting claims 20 and 21. The Applicant asks that the Examiner provide such reasons and an opportunity for the Applicant to respond.

Regarding claims 22 and 23, the Office Action argues that the limitations of these claims are "expected". The Applicant maintains that a passive reference to "expectations" doesn't constitute a statutory basis for rejecting claims and asks for a more complete explanation and an opportunity to respond.

Claims 24 and 27 are allowable because they depend from an allowable base claim.

The Office Action rejects claims 4-6 and 25-26 under 35 USC §103(a) as being unpatentable over Pepper et al. and Ukida et al. as applied to claims 1 and 9, and further in view of U.S. Patent No. 5,700,573 to McCullough. According to the Action, McCullough teaches a means to produce biregional fibers from a homogenous polymeric material in which the outer fiber portion of the polymeric material is oxidation stabilized and then carbonized to form two distinct regions in the fiber. According to the Action, the homogenous polymeric fiber is preferably a standard acrylic polymer. The Office Action reasons that because this process is carried out under similar conditions to the production of single region carbon fibers, it would have been obvious to one of ordinary skill at the time of invention to include the partial oxidation and carbonization method of McCullough and the process of Pepper et al. taking with Ukida et al. to produce biregional fibers. In response, the applicant maintains that claims 4-6 and 25-26 are patentable over Pepper et al. and Ukida et al. in view of McCulloch because all these claims depend from allowable base claims.

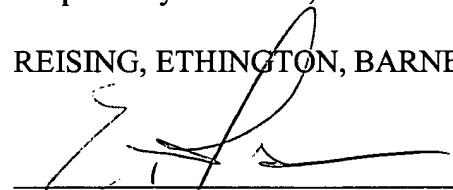
The Office Action rejects claims 10-12 under 35 USC §103(a) as being unpatentable over Pepper et al and Ukida et al. and further in view of Berkebile et al. (U.S. Patent No. 5,316,654). In response, the Applicant maintains that claims 10-12 are allowable because they depend from an allowable base claims.

The pending claims recite patentable subject matter and are allowable. Therefore, the Applicant respectfully submits that the application is now in condition for allowance and respectfully solicits such allowance. Please favorably reconsider the outstanding Office Action.

I authorize the Assistant Commissioner to charge any deficiencies, or credit any overpayment associated with this communication to Deposit Account No. 50-0852. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

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